

REMARKS

Reconsideration of all grounds of objection and rejection, and allowance of all the pending claims are respectfully requested in light of the above amendments and the following remarks. Claims 1-12, as shown above, remain pending herein. Claim 1 has been amended to clarify the claimed invention, support for which is found in the specification at least at page 7, lines 1-3.

SUMMARY OF THE OBJECTIONS AND REJECTIONS:

- (1) The drawings are objected to for nearly two pages of items in the Office Action.
- (2) The specification is alleged to be replete with terms which are not clear, concise and exact.
- (3) Claims 1-12 stand rejected under 35 U.S.C. §103(a) over Chraplyvy et al. (U.S. 4,905,253 hereafter "Chraplyvy") in view of Takagi et al. (U.S. 6,455,388, hereafter "Takagi").

APPLICANTS' TRAVERSAL:

(1) While Applicants have made every effort to comply with nearly two pages of drawing critiques on the Office Action, it is respectfully but strongly submitted that the Examiner should realize that the drawings encompass *different stages of manufacturing process, and as such the different stages do not all have the same components that are being requested to be shown in each of the drawings. For example, the metal layer 41 and 42, which are arranged on the laser diode region 21 and modulator region 22, respectively, are not introduced into the process until Fig. 4, and do not belong in Figs. 2 and 3. The mask region 33 of SiO₂, etc. masks the isolation region 43 underneath*

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it. For example, the ZnO, etc. coatings are also shown arranged on the diode and modulator regions in Fig. 3, but they aren't introduced into the process in Figure 2 and are covered by the typically gold layers 41 and 42, respectively.

For the convenience of the Examiner, Applicants provide a list of reference numerals assigned in the drawings as follows:

20: semiconductor structure;	33: SiO ₂ mask layer;
21: laser region;	34: p-type doped layer with Zn diffusion (34-1 p-InP, 34-2 p-InGaAs);
22 modulator region;	41,42: metal contact layer;
23 p-clad layer;	43: trench region;
24 undoped InP layer;	
25 undoped InGaAs:	

Reconsideration and withdrawal of these grounds of objection are respectfully requested, and please contact the Applicants' undersigned representative by telephone if the Examiner has any additional concerns with the corrected drawings.

(2) Applicants strongly but respectfully disagree with the notion that the specification is "replete with inexact and terms that are not concise." A person of ordinary skill in this art commonly use chemical shorthand to describe chemical compounds making up the layers of the invention. A layer comprising InP is clearly understood by persons with a rudimentary chemical background, as

these are chemicals found in the Periodic Table of the Elements in any general chemistry book. The same holds true for an InGaAs cap layer. Applicants also note that "Zn-diffusing materials" refers to the chemical shorthand for zinc. Applicants strongly but respectfully request reconsideration of the allegation in the Office Action that these terms are verbose and imprecise.

The chemical terms are easily identified, precise, and it is clearly known in the art that a "cap layer" is one that is on top of, (i.e. cap's off, lower layers).

With regard to the InP layers being undoped, p-doped, or n-doped, these are also rudimentary chemical terms referring to isotopes, where p doped material versus n-doped material has to do with the dopant material having an excess of a shortage of electrons. These terms are commonly used every day by persons of ordinary skill in the art and are easily understood by anyone with basic chemical background.

Applicants also respectfully submit that terminology such as "impurity doping, and the growing of a layer on top of another layer are commonly used semi-conductor terms. A person of skill in the art clearly understands these terms.

In an effort to comply in good faith, Applicants have reviewed the specification and made minor changes to improve clarity. Applicants request reconsideration of the aforementioned terms which are commonly used and understood by persons of ordinary skill in the art. It is respectfully suggested that the Supervisory Patent Examiner review the response if any of these objections are upheld so as not to cause unnecessary delay in the prosecution of the present application.

(3) It is respectfully submitted that none of the instant claims would have been obvious to a person of ordinary skill in the art over the combination of Chraplyvy in view of Takagi. It should be

first understood that the presently claimed invention present invention provides a method of fabricating an electro-absorption modulator integrated laser (EML) that obviates the need for separate isolation etching control and ion implantation. The present invention electrically isolates the laser region and the modulator region by the structure of the undoped InP layer 24 and the undoped InGaAs layer 25 formed in the trench region.

The trench region is etched to a predetermined depth for isolation, typically in the InGaAs layer. The InGaAs and the InP layer in the trench, (on which the InGaAs is grown), are protected with a mask, and thus the InGaAs and InP layers are not doped with an impurity, and thus do not experience Zn diffusion. The InGaAs layer electrically isolates a laser diode region from the modulator region, so that the Zn-diffused areas act as a clad layer and a capping layer. Even after a trench is etched, there is still sufficient InGaAs to isolate the laser and the modulator. P-InP layer 34-1 works as a clad layer in the laser region and the modulator region, and p-InGaAs layer 34-2 acts as a cap layer in both the laser region and the modulator region.

In contrast, the combination of Chraplyvy in view of Takagi fails to teach the above-claimed feature, as the cladding is typically isolation-etched thinned to perform the isolation between the laser and the modulator, unlike the cladding in the presently claimed invention. For example, Chraplyvy discloses than an isolation groove 32 is formed by etching or ion implantation (col. 6, lines 17-22) that is *not filled with an undoped conductor later, unlike the present invention.*

In addition, the combination of references disclose nothing more than the conventionally known methods of ion implantation and isolation etching of the trench, which is not part of the claimed invention.

Applicants have clarified the claimed invention by amending claim 1 to recite the step of that: selectively etching the mask layer and the InGaAs layer to a predetermined depth such that a remaining layer of InGaAs electrically isolates the laser diode section from the modulator section.

It is respectfully submitted that the combination of Chraplyvy in view of Takagi fails to teach that the trench section is prevented from receiving diffused Zn, and that the diffused Zn in the laser diode section and modulator section act as a clad layer and a capping layer.

Nor would a person of ordinary skill in the art have found that the claimed invention would in view of the teachings of the combination references, as they are completely silent in this regard.

Applicants respectfully submit that the MPEP lists the grounds for alleging/sustaining a rejection under 35 U.S.C. §103(a). In the MPEP's explanation, the case of *In re Fritch*, 972 F.2d 1260, 1266, 23 USPQ 2d 1780, 1783-84 (Fed. Cir. 1992) is cited, wherein the Court of Appeals for the Federal Circuit held that:

Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under section 103, teachings of references can be combined *only* if there is some suggestion or incentive to do so. Although couched in terms of combining teachings found in the prior art, the same inquiry must be carried out in the context of a purported obvious "modification" of the prior art. The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.

In the present case, it has not been set forth how the combination of references suggests the desirability of the modification resulting in Applicants instant claims.

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Accordingly, reconsideration and withdrawal of this ground of rejection are respectfully requested, as the combination of references fails to disclose, suggest, or motivate the artisan such that the instantly claimed invention would have been obvious at the time of the invention.

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Conclusion:

For all the foregoing reasons, it is respectfully submitted that all grounds of objection and rejection have been overcome. A Notice of Allowance is respectfully requested.

Should the Examiner deem that there are any issues which may be best resolved by telephone communication, he is respectfully requested to telephone Applicants' undersigned Attorney at the number listed below.

Respectfully submitted,



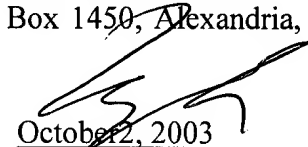
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Date: October 2, 2003

CERTIFICATE OF MAILING UNDER 37 CFR 1.8

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(Name of Registered Representative)


October 2, 2003
(Signature and Date)